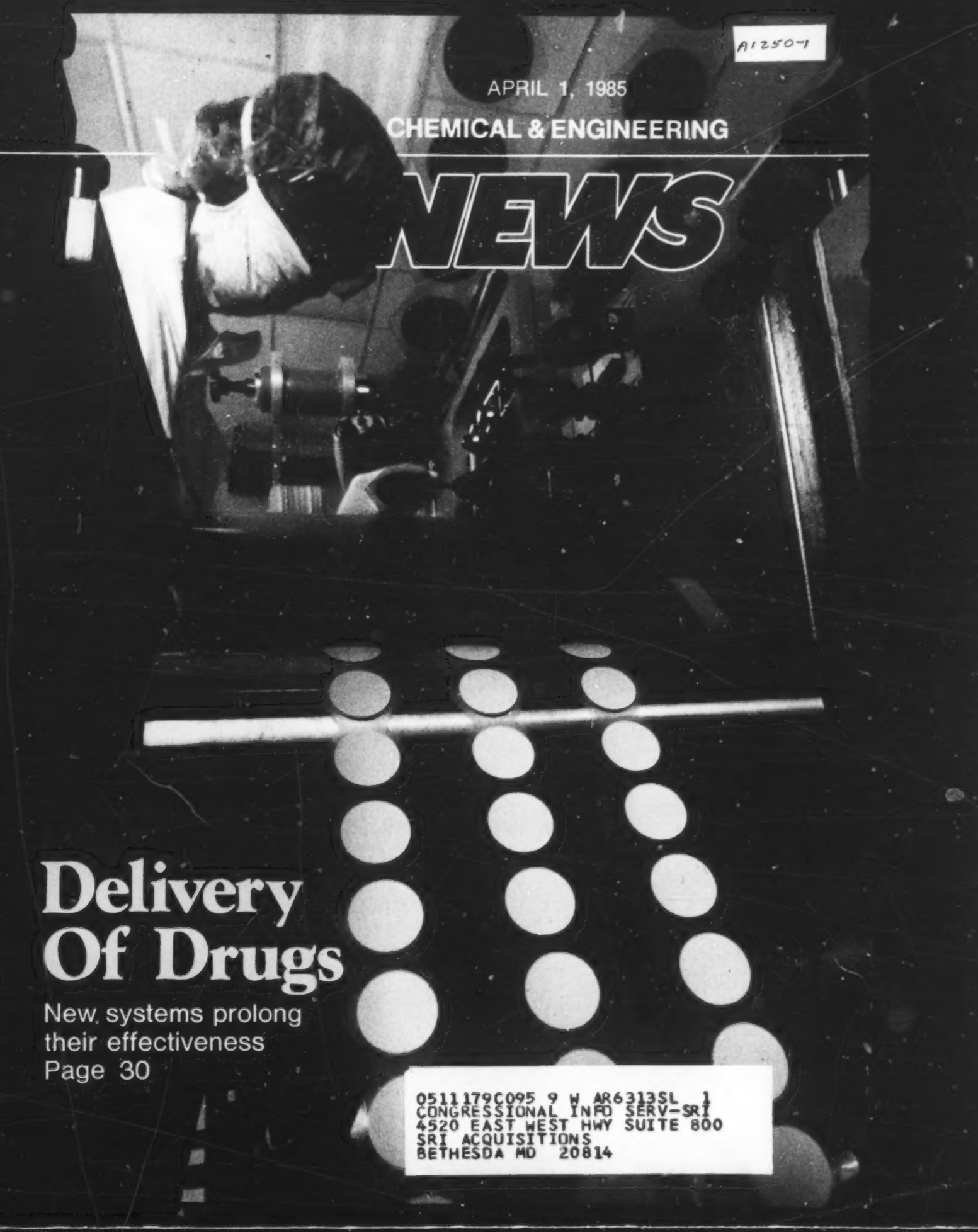
A12504

APRIL 1, 1985

CHEMICAL & ENGINEERING

NEWS



Delivery Of Drugs

New systems prolong their effectiveness

Page 30

0511179C095 9 W AR6313SL 1
CONGRESSIONAL INFO SERV-SRI
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

CHEMICAL & ENGINEERING NEWS

Volume 63, Number 13
CENEAR 63 (13) 1–64
ISSN 0009-2347

APRIL 1, 1985

News of the Week

■ **CMA announces new initiatives to increase public access to hazard information about chemicals but Congress continues to call for stricter industry regulation.** **Page 6**

■ **NAS will honor six chemists for their contributions to science.** **Page 7**

■ **C&EN senior editor William F. Fallwell is dead at age 44.** **Page 7**

■ **Latest estimate of natural gas in U.S. recoverable by conventional methods is 784 trillion cu ft.** **Page 7**

■ **Cobalt and manganese can be recovered from low-grade ores in molten salt method developed at Argonne National Laboratory.** **Page 8**

■ **G. D. Searle takes itself off the market.** **Page 8**

Cover: Operator at Alza Corp. checks production of transdermal patches used for slow release of scopolamine, which combats motion sickness

Letters 4

Concentrates
Business 10
Government 15
Science/Technology 18

The Departments
New Products 43
ACS Comment 49
Meetings 51
People 52
Newscripts 64

Business

Nuclear power plants pinched for space to store spent fuel could transship it to sites that have excess space. **Page 11**

Leveling of ethylene demand halts growth of light hydrocarbons used to make it; biotech revenues slow in fourth quarter. **Page 12**

International Business

European petrochemical producers nix preferential treatment for Saudis, who warn protectionism could lead to price wars. **Page 14**

Government

Reagan Administration move to cut back number of research grants funded by NIH may not be legal. **Page 16**

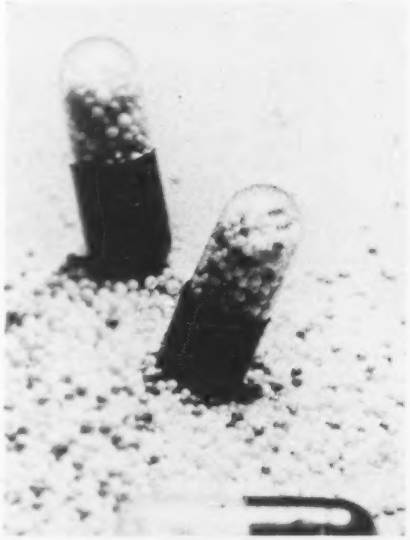
Document on scientific principles will guide federal agencies in assessing chemical carcinogenicity risks. **Page 17**

Science

AIDS epidemic continues despite expanding knowledge of its cause; blood test for antibodies faces questions of legality. **Page 19**

Perkin Medal

Perkin Medalist Paul B. Weisz of the University of Pennsylvania is best known for his contributions to zeolite catalysis. **Page 27**



Special Report

Controlled-release delivery of drugs has been a growing target of research during the past 10 years. **Page 30**

Academy to present awards to six chemists

Chemist Richard B. Bernstein and biochemists Martin F. Gellert, Tom Maniatis, Ira Herskowitz, Gerald M. Rubin, and Allan C. Spradling will be among 15 scientists honored by the National Academy of Sciences for outstanding contributions to science at the academy's annual meeting on April 22.

Bernstein, professor of chemistry at the University of California, Los Angeles, will receive the NAS Award in Chemical Science for his theoretical and experimental work on chemical reactivity. Bernstein uses molecular beam scattering and other laser techniques to study elastic, inelastic, and reactive collisions of small molecules and ions. His prize, which consists of $10,000 in cash and a bronze medal, was established by Occidental Petroleum Corp. to honor Armand Hammer.

The Richard Lounsbery Award, a $50,000 prize and an additional $20,000 for travel, study, or other efforts, will be shared by Maniatis, professor of biochemistry and molecular biology, Harvard University, and Gellert, chief of the section on metabolic enzymes of the National Institute of Arthritis, Diabetes, Digestive & Kidney Diseases. The researchers are being honored for their contributions to understanding the structure and function of DNA.

Herskowitz, professor of biochemistry at the University of California, San Franscico, will receive the $5000 NAS Award for Scientific Reviewing for his focused and enlivening reviews of phage biology. Rubin, professor of biochemistry at the University of California, Berkeley, and Spradling, a staff member at Carnegie Institution of Washington, will share the $5000 U.S. Steel Foundation Award in Molecular Biology for their development of a method to stably integrate cloned genes into the germ cells of living fruit flies.

Other awards for chemically related work will go to Steven E. Lindow, associate professor of plant pathology, University of California, Berkeley, for his research in the genetic control of ice nucleation in bacteria, and to Isidor I. Rabi, university professor emeritus, Columbia University, for his work on behalf of the peaceful uses of atomic energy. □

C&EN senior editor Bill Fallwell dies

C&EN senior editor William F. Fallwell died suddenly on March 24 in his New York City apartment. He was 44 years old.

He joined the editorial staff of C&EN in 1966. Apart from a three-year stint in Washington, D.C., as managing editor from 1981 to 1984, he spent his career in various capacities in the magazine's New York City operation.

His contributions to the magazine were legion. He was a prolific writer. And he did much to enhance C&EN's coverage of the chemical industry.

He also helped to broaden and integrate the magazine's approach to many other topics. A perceptive and analytical observer of the chemical scene, Fallwell had an acute sense of the relationships among the scientific, technical, governmental, and business aspects of chemistry and of their impact on society in general.

A native of Boston, he received a B.A. in chemistry from Principia College, Elsah, Ill. He served in U.S. Army Intelligence for three years before joining C&EN. □

Group updates estimate of natural gas reserves

The most likely magnitude of natural gas potentially recoverable in the U.S. by conventional production methods is now estimated to be about 784 trillion cu ft. If added to the 200 trillion cu ft of proved reserves remaining in discovered fields, the total resource would be more than 57 times the 1984 natural gas production of 17.2 trillion cu ft.

These are the latest estimates to come from the Potential Gas Committee, which provides a biennial evaluation and has just released a preliminary report of its analysis of the results of exploration through the end of 1984. The committee consists of individual volunteers from the natural gas industry (production, pipeline, and distribution companies), independent geologists, government agencies, and academic institutions concerned with natural gas. Although independent, it functions with guidance and assistance from Colorado School of Mines' Potential Gas Agency, which receives major support from the American Gas Association.

Although the year-end estimate for 1984 for the entire U.S. is reduced from that at the end of 1982, the estimate for one geological province—the eastern Gulf of Mexico offshore—has been increased significantly. Discoveries in this area in recent years, the committee says, have demonstrated the probability of sizable natural gas resources there. At the same time, estimates for two other provinces—the Wind River basin of Wyoming and the Wyoming-Utah-Idaho Thrust Belt, have been reduced significantly as a result of relatively recent exploratory drilling.

For its estimates, the committee includes all of the resources that it believes can be discovered and produced utilizing conventional natural gas exploration, drilling, and production technology. It also classifies the resources as probable, possible, and speculative. "Probable" are those, in addition to proved reserves, estimated to remain in undeveloped portions of fields already discov-

U.S. has 784 trillion cu ft natural gas potential

Location	Most likely amounts, trillion cu ft		
	Probable	Possible	Speculative
Onshore	150	215	191
Lower 48 states	143	199	163
Alaska	7	16	28
Offshore	35	78	115
Lower 48 states	32	65	44
Alaska	2	13	71
Total lower 48 states	176	264	207
Total Alaska	9	29	99
TOTAL U.S.	185	293	306

Note: Figures may not always add because of rounding.

ered; "possible" are those that may be found through new field discoveries within formations and provinces already known to be productive; and "speculative" are those undiscovered resources that may be found through new field discoveries in formations and provinces not yet demonstrated to be productive.

The current report represents a major departure for the committee in that it has organized its work in a way that provides much more detailed information, on a province-by-province basis. Also, starting with the current report, the committee is publishing its maximum and minimum estimates of the resource potential, as well as its estimate of the most likely potential.

The complete report, due out in June, is available for $25 plus shipping and handling from Potential Gas Agency, Campus Box 13, Colorado School of Mines, Golden, Colo. 80401. □

Cobalt and manganese from low-grade ores

Chemists at Argonne National Laboratory have discovered a simple method for recovering cobalt and manganese from low- and medium-grade ores. The metals are extracted into a molten salt mixture, then separated from the salt mixture by electrolysis.

The new extraction method could prove advantageous in deep-sea mining operations. It also could provide a less costly way to recover the two metals from land ores that are currently mined primarily for copper, nickel, or iron.

The process is being developed by Argonne's Victor Maroni, working with Samuel von Winbush (now at Argonne on research leave from State University of New York, Old Westbury campus).

Studies to date have focused on deep-sea nodule ores containing about 30% manganese, 7% iron, 1% nickel, 1% copper, and 0.3% cobalt. In tests at 450 °C, a eutectic mixture of sodium, potassium, and magnesium chlorides readily extracted nearly 100% of the metals. Equilibrium extraction conditions were reached with low salt-to-ore ratios—less than 3 to 1 by weight—in about an hour. The copper and iron form complexes that quickly volatilize from the molten solution. Manganese and nickel complexes also volatilize, but at a slower rate.

The extracted cobalt and manganese can be deposited on a carbon cathode at electrolysis potentials of 1.0 to 1.5 volts. By proper control of the potential, cobalt can be selectively recovered even in the presence of manganese and other transition metals.

Given the present state of the metal industries, Maroni observes, people might look at the development and say, "So what?" However, more than 90% of the cobalt and manganese used in the U.S. is imported; it's comforting to know that in a pinch the strategic metals could be obtained efficiently from North American ores. And for deep-sea mining, the process is compact enough to be carried out on ships or floating platforms, with no need to transport ore to shore for refining. Most of the salts used in the process could be recycled, and depleted ore could be returned to the ocean floor with a minimum of pollution. □

Searle no longer wants to be sold

Apparently unable to attract a high enough bid, G. D. Searle has ended its effort to sell the company either in parts or as a whole. Instead, the pharmaceutical firm will continue to operate as an independent company.

Searle began to seek a buyer or buyers last September after the Searle family, which owns some 34% of the company's stock, asked the firm's management to find ways to diversify the family holdings. Subsequently, interest in acquiring parts of the company was expressed by a number of firms, including Monsanto, which is looking for a pharmaceutical marketing organization to bolster its move into the health care field. Pfizer also talked to Searle about buying various segments including the NutraSweet (aspartame) sweetener division. In addition, Angus Chemical, along with its parent corporations Pacific Gas Transmission and Alberta Natural Gas, offered to buy the NutraSweet unit in January.

Now Searle's board has voted unanimously to keep the company intact. In a letter, members of the Searle family wrote that they were satisfied that the decision is "in the best interests of all concerned."

Angus, expressing disappointment over Searle's decision, says it will go ahead with plans to manufacture and market aspartame produced through its own technology overseas. The company's Irish subsidiary, Angus Fine Chemicals, is building a plant due on stream late this year in Ringaskiddy, Ireland, that will make aspartame and other specialty chemicals for sale in Europe and elsewhere abroad. Searle's U.S. patent on aspartame expires in 1992.

Searle president and chief executive officer Donald H. Rumsfeld says he expects 1985 "to be a year of improved financial performance as well as a period of continued investment for the introduction and development of new pharmaceutical products" and expansion of the company's sweetener and other businesses.

At the same time that Searle announced its decision, the board also increased the company's quarterly cash dividend to 25 cents per share from 13 cents per share. □

Biotechnology revenues slowed in fourth quarter

Last year featured sharp increases in revenues for most biotechnology-based companies. For some of the firms that started up during the late 1970s and early 1980s—particularly those using monoclonal antibody technology for diagnostic and animal health products—the surge in revenues came largely from product sales. For others—including some of the largest of these companies—still lacking much in the way of products to sell, revenues grew because of added contract research and development fees.

For the year, a dozen biotechnology-based companies—representing more than three quarters of all revenues for such companies—registered a composite increase in revenues of 76% over 1983 to $271 million. Together, these same firms wracked up a $30 million loss, 11% bigger than the year before. There was great variation in results from company to company, however. Several firms reported earnings; less than half the group accounted for most of the losses.

In the fourth quarter of 1984, 14 firms (the above 12 plus two others) reported a composite revenue gain of 42% from fourth-quarter 1983 to $69 million, compared to jumps of 99% and 92% in the two preceding quarters from the year-earlier periods. The composite loss for these firms ballooned to $49 million, 47% more than in fourth-quarter 1983. Most of the rise, however, resulted from a 341% increase in the net loss reported by Genex, which was hit hard by cost overruns in starting up a new plant and by increased competition in the aspartame precursor marketplace in which the firm's chief product, genetically engineered L-phenylalanine, is sold.

For the most part, earnings at those firms that did not report losses remain nominal, more a function of investor reassurance than an actual measure of commercial achievement. Genentech, for instance, still the biggest of the new biotechnology firms, reported a 171% jump in fourth-quarter net income to $612,000. The company warns about attempting to find a pattern in this improvement, however.

"As in the past, significant quarter-to-quarter income and revenue fluctuations may occur during 1985 due to variations in the timing of revenues for licensing and research benchmarks," the company comments. "These fluctuations have no impact on the company's long-term growth." Genentech, in fact, is still not marketing a product of its own. Contract research, licensing revenues (mainly for human insulin), and the manufacture of clinical products for contract partners account for 94% of revenues, interest income for the rest.

Cetus also reported positive net income for the quarter of $101,000. Very little revenue came from products, however. The breakdown: R&D fees 72%, royalties and product sales 2%, and interest and other 27%. Biogen, with a $13.1 million loss for the year, up 13% from 1983, cut its fourth-quarter loss nearly two thirds to $2.2 million.

"We see 1984 as the end of our first stage of development," says Mark Skaletsky, principal operating officer and acting chief executive at Biogen, since former chairman Walter Gilbert's abrupt departure last December (C&EN, Dec. 24, 1984, page 5). "Our size has stabilized, and our goal is to have a reduced loss for the full year in 1985." Much of that stabilization was achieved by laying off 13% of the company's staff last fall.

Hybritech, with a 124% increase in revenues to $11.4 million, joined the ranks of the larger biotechnology-based firms in revenues. Hybritech is selling a number of monoclonal-based products. Similarly, but on a far smaller scale, competitor Monoclonal Antibodies, fueled by sales of its pregnancy diagnostic test kits, raised its revenues for the quarter 352% to $1.4 million. Of that total, nearly three quarters came from product sales.

David Webber, New York

Biotechnology firm results varied widely in fourth-quarter 1984

	FOURTH-QUARTER 1984[a]						FULL-YEAR 1984[b]					
	Revenues[c] ($ millions)	Earnings[d] ($ millions)	Change from 1983 Revenues	Change from 1983 Earnings	Profit margin[e] 1984	Profit margin[e] 1983	Revenues[c] ($ millions)	Earnings[d] ($ millions)	Change from 1983 Revenues	Change from 1983 Earnings	Profit margin[e] 1984	Profit margin[e] 1983
Amgen	$ 2.35	$−1.94	20%	def	def	def	na	na	na	na	na	na
BioTechnica International	0.37	−1.18	18	def	def	def	$ 1.37	$ −4.39	289%	def	def	def
Biogen	9.38	−2.22	164	def	def	def	31.39	−13.13	70	def	def	def
California Biotechnology	2.17	−0.12	19	def	def	0.5%	8.28	−0.13	57	def	def	2.4%
Centocor	4.10	0.36	71	nm	8.7%	def	12.84	0.70	73	nm	5.5%	def
Cetus	13.25	0.10	25	−65%	0.8	2.7	59.54	0.83	61	nm	1.4	def
Collaborative Research	2.12	−1.17	51	def	def	def	na	na	na	na	na	na
Damon Biotech	1.11	−1.96	2	def	def	def	5.08	−5.03	57	def	def	def
Genentech	18.13	0.61	35	171	3.4	1.7	69.79	2.72	48	141%	3.9	2.4
Genex	1.30	−7.50	−72	def	def	def	34.80	−7.40	214	def	def	def
Hybritech	11.39	0.00	124	−96	0.0	0.5	33.70	0.37	112	nm	1.1	def
Molecular Genetics	2.10	−0.65	8	def	def	6.4	9.22	−0.64	33	def	def	7.9
Monoclonal Antibodies	1.36	−1.07	352	def	def	def	4.29	−3.57	261	def	def	def
Ribi ImmunoChem	0.16	−0.10	−9	def	def	def	0.91	−0.29	36	def	def	def

a For three-month period ending closest to Dec. 31. b For 12-month period ending closest to Dec. 31. c Includes sales, contract research, royalty, and interest revenues. d Excludes extraordinary credits. e After-tax income as a percentage of revenues. na = not available. nm = not meaningful. def = deficit.